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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/530,816

02/28/2006

Kai Eck

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01/07/2008

PHILIPS INTELLECTUAL PROPERTY & STANDARDS

P.O. BOX 3001

BRIARCLIFF MANOR, NY 10510

EXAMINER

BITAR, NANCY

ART UNIT

PAPER NUMBER

2624

MAIL DATE

DELIVERY MODE

01/07/2008

PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	Application No. 10/530,816	Applicant(s) ECK ET AL.	
	Examiner Nancy Bitar	Art Unit 2624	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 28 February 2006.
- 2a) ☐ This action is FINAL.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-12 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-12 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 08 April 2005 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |   |   |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)  | 5) <input type="checkbox"/> Notice of Informal Patent Application                       |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date <u>05/03/07, 02/28/06, 04/08/05</u> | 6) <input type="checkbox"/> Other: _____  |

## DETAILED ACTION

### *Claim Rejections - 35 USC § 103*

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1-12 rejected under 35 U.S.C. 103(a) as being unpatentable over Beier et al (Advanced Subtraction Angiography: Mask Selection and Image Registration) in view of Pfeiler et al ( US 4,709,385).

As to claim 1, Beier et al. teaches an image processing unit which comprises an input for the signal of a current image of a body volume,

the body volume being subject to a motion comprising several phases of motion ( numerous motion –related artifacts occur at the catheter, the diaphragm and the border of the heart muscle, page 106, paragraph 2); at least one input for a signal which represents the phase of motion of the body volume which belongs to the current image ( the ECG signal is used to find the mask image in the reference sequence corresponding to the current contrast medium image, page 106, paragraph 3); a memory in which previous images of the body volume are stored together with the associated phases of motion ( a matrix of displacement vectors is calculated based on the movement of small image regions of the two

images, page 106, paragraph 4) , the image processing unit being arranged to associate with the current image that previous image from among the previous images whose phase of motion is closest to the phase of motion of the current image ( page 106 , closest similarly, paragraph 4 ) . While Beier meets a number of the limitations of the claimed invention, as pointed out more fully above, Beier fails to specifically teach the memory storing the previous images with the phase motion.

Specifically, Pfeiler et al. teaches the entry of the individual images into the image memory occurs at predetermined heart phase of the heart cycle and as a consequence of the readout of the image memory 9 in synchronized heart phase to the current video signal, corresponding individual images are subtracted thereby guaranteeing in all instances that the vessels obtained from the stored image correspond to real curves and contours ( column 3, lines 18-49). Because the control unit has means for varying the duration of the stored heart phase by interpolating of the individual images over time thus achieving an optimal adaptation of the time duration. It would have been obvious to one of ordinary skill in the art to use Pfeiler image memory in Beier image registration in order .Therefore, the claimed invention would have been obvious to one of ordinary skill in the art at the time of the invention by applicant.

As to claim 2, Beier teaches an image processing unit as claimed in claim 1, which is arranged to determine a distance between the phases of motion of the current image and an associated previous image and/or the time elapsed

since the last association and to reproduce said distance for a user (a matrix of displacement vectors is calculated based on the movement of small image regions of the two images, page 106, paragraph 4).

As to claim 3, Beier teaches an image processing unit as claimed in claim 1, wherein the body volume is a biological body volume and the motion of the body volume is caused by heartbeat and/or respiration, and that the phase of motion is detected by means of an electrocardiogram and/or by the signal from a respiration sensor ( the fast and complex motion of the beating heart is especially responsible for numerous subtraction artifacts, page 105, paragraph 1 , see also Pfeiler et al column 1, lines 66-68).

As to claim 6, Beier et al. teaches an image processing unit as claimed in claim 1, wherein together with each previous image there are stored the associated electrocardiogram and the relative instant of the image acquisition, and that the image processing unit is arranged to carry out the following steps: determination of a transformation which maps the electrocardiograms of the current image and a previous image one onto the other; and determination of the relative position of the phase of motion of the current image and the previous image, as expressed in the electrocardiogram, by means of the transformation ( these motion vectors serve as the input for a mathematical transformation to generate a new mask, page 106, paragraph 4).

As to claim 7, Beier et al. teaches an image processing unit as claimed in claim 1, which is arranged to carry out a motion correction for a motion of the

entire body volume between the current image and the associated previous image (mismatches that occur are detected and corrected using the continuity constraint in the correspondences, page 106, paragraph 4).

As to claim 8, Pfeiler et al. teaches an image processing unit as claimed in claim 1, wherein said image processing unit is coupled to a reproduction unit and is arranged to reproduce the current image and the associated previous image in superposed form on the reproduction unit (readout of the individual images of the image memory is synchronized with the heart cycle signals from the EKG circuit such that individual images from the image memory are superimposed with current video signals within the heart cycle, column 2, lines 1-8 and column 4, lines 5-22)

As to claim 9, Beier et al. teaches an method of associating a current image of a body volume which is subject to a motion comprising different phases of motion with one of several previous images of the body volume, in which method comprises the steps of: the phase of motion is determined together with set of relevant images ; and the current image associated with that one of the previous images which has a phase of motion is closest to the phase of motion of the current image( the template representing the minimum of the cost function is of closest similarity to the reference template in the native image and is chosen as winner from among all candidates, page 106, paragraph 4) .

As to claim 10, Pfeiler teaches an method as claimed in claim 9, wherein distance between the phases of motion of the current image and the associated

previous image and/or the time elapsed since the last association is determined and reproduced for the user ( column 3, lines 50, column 4, lines 1-22 note that Pfeiler teaches storing the images includes the phase of motion over time ).) .

Claims 11-12 differ from claim 1-10 only in that claim 1-10 are method claims whereas, claims 11-12 are an apparatus claim. Thus, claims 11-12 are analyzed as previously discussed with respect to claims 1-10 above.

### **Conclusion**

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Kiuru et al (US 6,522,720) is cited to teach determine the relative lung perfusion image with the fluoroscopic principle. Transmitted X-ray radiation through the lungs of the patient under examination is measured at least during one heart cycle. An image intensifier is used to collect the images which are digitized, taken to the apparatus and further analyzed. The results are the grey scale image and numerical map depicting the lung perfusion distribution

Bredno et al (US 2006/0257006) is cited to teach the invention relates to a device and to a method for superimposed display of current image of an object such as a catheter for example, and a map image of the vascular system. In this connection, for map images archived in a memory the associated distance images are calculated by means of a distance transformation. In the current image the object is segmented .By means of the distance image, a

transformation of the map image is then calculated, so that, when the current image and the transformed map image are superimposed on a monitor, the image of the object lies in the path network of the transformed map image.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Nancy Bitar whose telephone number is 571-270-1041. The examiner can normally be reached on Mon-Fri (7:30a.m. to 5:00pm).

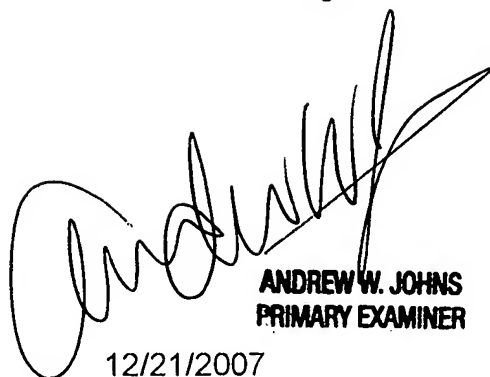
If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Bhavesh Mehta can be reached on 571-272-7453. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.



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A handwritten signature in black ink, appearing to read 'Andrew W. Johns', is written over the printed name and title. The signature is fluid and cursive, with a large initial 'A' and a long, sweeping tail that extends to the right.

**ANDREW W. JOHNS**  
**PRIMARY EXAMINER**

12/21/2007

Nancy Bitar